Appraisal Report
East Hartford, Connecticut
Connecticut River

Local Flood Protection

December 1989

US Army Corps of Engineers
New England Division

SYLLABUS

The purpose of this investigation was to assess the existing local protection project (LPP) on the Connecticut River in East Hartford, Connecticut, to determine if modifications to the project are justified and warrant further Federal study. Engineering Circular EC-11-2-154 provides direction to review existing LPP's that were specifically authorized by Congress.

The LPP in East Hartford was completed in 1943 and has been maintained in excellent condition since that time. No significant modifications to the project have occurred. The original design for the project provided for 5 feet of freeboard for dikes and 3 feet for concrete walls, which is greater than current freeboard requirements by 2 feet and 1 foot, respectively. This was because of the indefinite plans for construction of 20 upstream flood control reservoirs which would serve to lower flood levels in East Hartford. Eventually, 16 of the 20 reservoirs were built, and together with the extra freeboard, the project currently provides flood protection for East Hartford up to the 700 year event.

Because of the high level of protection already provided by the project, and a lack of recent widespread development in the protected area, raising the dikes and walls to a higher level of protection would provide minimal economic benefits and is found to be unnecessary at this time.

Recently, there has been demand by real estate developers for property along the Connecticut River in East Hartford. The dike footprint currently occupies much of this prime real estate, and there has been a desire by private interests to replace dikes with floodwalls in order to gain use of the land. If this occurs, it is recommended that developers be required to replace any dikes they remove with new floodwalls providing an equal level of protection, and any such changes must be reviewed by the Corps of Engineers and the State of Connecticut prior to implementation.

APPRAISAL REPORT
LOCAL FLOOD PROTECTION PROJECT
EAST HARTFORD, CONNECTICUT

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I. INTRODUCTION

A. AUTHORITY

The town of East Hartford, Hartford County, Connecticut is located on the east bank of the Connecticut River, 52 miles above its mouth in Long Island Sound. The East Hartford Local Protection Project is located along the east bank of the Connecticut River and the north bank of the Hockanum River in East Hartford (see Plate 1). The East Hartford L.P.P. was authorized by the Flood Control Act approved 28 June 1938. This Flood Control Act was modified on 15 October 1940.

Engineering Circular EC 11-2-154 provides direction to review the adequacy of completed LPP's which were specifically authorized by Congress. Development in watershed areas and new information on basin hydrology since the project's construction may warrant an updated analysis of the degree of protection being realized. The objective is to determine whether it is advisable to modify the structure due to changes either in the area being protected or to make changes to the project to improve its viability, safety, or reliability.

B. PURPOSE AND SCOPE

The purpose of this investigation is to assess the existing LPP on the Connecticut River in East Hartford, Connecticut, to determine if modifications are advisable and warrant further Federal study.

The scope of this report is of a reconnaissance nature. The objectives are as follows:

- Compile existing information
- Initiate public involvement
- Establish the need for modification
- Identify modification opportunities
- Determine preliminary feasibility of modifications
- Recommend future course(s) of action

The study process is divided into two phases-reconnaissance and feasibility. In reconnaissance, modifications to the project are screened from the standpoints of economic, environmental and engineering integrity and safety considerations. The detail used is at the level of an initial appraisal investigation. Items of local cooperation, both past and future, are addressed when an affirmative action is recommended.

If warranted, the feasibility phase would detail the actual modification alternatives and recommend a particular course of action. The recommendation would be based on a comparison of each alternative's expected accomplishments.

C. PUBLIC COORDINATION

The town of East Hartford was notified by letter, dated 13 July 1988, of the New England Division's (NED) initiation of study efforts to review the existing LPP for the advisability of possible modifications.

On 9 February 1989, personnel from NED visited the project and protected area. Meetings were held with the town's Planner, Director of Public Works, and Supt. of Flood Control Dikes to discuss the investigation and obtain their views. The Town Planner indicated that escalating real estate prices in the area have caused the area of the dike to become high priced potential development property. They indicated their support for any additional protection that the Corps of Engineers suggests, including the raising of the dike.

D. PRIOR STUDIES

The following are previous studies and reports related to the current investigation.

(1) New England Division, U.S. Army Corps of Engineers, "The Report of Survey and Comprehensive Plan for the Connecticut River", dated 20 March 1937.

(2) New England Division, U.S. Army Corps of Engineers, "Review of Reports on Surveys of the Connecticut River and Tributaries for Flood Control", dated 28 February 1940, revised 18 December 1944.

(3) The East Hartford LPP is operated through procedures established in the Operation and Maintenance Manual, dated January 1946, prepared by the Corps of Engineers.

(4) New England - New York Inter-Agency Committee, "The Resources of the New England - New York Region", dated March 1955.

(5) New England Division, U.S. Army Corps of Engineers, "Connecticut River Basin - Comprehensive Water and Related Land Resources Investigation", June 1970.

(6) New England River Basins Commission, "The River's Reach - a United Program for Flood Plain Management in the Connecticut River Basin", dated December 1976.

(7) New England Division, U.S. Army Corps of Engineers, "Plan of Study - East Hartford Local Protection Modification Study", dated July 1977.

(8) The Federal Emergency management Agency's (FEMA) Flood Insurance Study for the town of East Hartford.

II. EXISTING CONDITIONS

A. PROJECT HISTORY AND DESCRIPTION

1. Construction

The existing project was built as a result of the disastrous floods of March 1936 and September 1938 along the Connecticut River and elsewhere in New England. Construction began in 1938 and was completed in 1943.

The LPP consists of a series of earth dikes and concrete walls to seal off a low area from river floods. Three pumping stations are in place to dispose of storm waters from behind the dikes and walls. The project protects about 760 acres of residential, commercial, industrial, and public property. The project's construction cost, including items of local cooperation (lands, easements, rights-of-way, etc.) was $2.4 million in 1943. By comparison, this same construction cost in 1989 dollars would be approximately $40 million. The updated cost was calculated by multiplying the 1943 construction cost by the average of the implicit price deflator and construction cost index for 1943 relative to 1989.

Dikes and Walls

The dikes and floodwall portion of the LPP consists of approximately 19,500 linear feet of earthfill dike and 750 linear feet of concrete floodwall. The dikes and walls are along the Connecticut and Hockanum Rivers, extending from high ground near Greene Terrace in the north to high ground at Brewer Lane and Central Avenue in the south. The dike embankment consists of compacted random and impervious material with a top width of 10 feet, and slopes varying between one on two (1 on 2) and one on three (1 on 3), with primarily one on three. The entire dike embankment, except where riprap is placed, is covered with a layer of seeded topsoil. The height of the dike averages about 15 feet, with a maximum height of about 25 feet. Sand and gravel toe drains have been provided on the land side at the toe of the slope for protection against seepage.

Pumping Stations

The East Hartford LPP has three pumping stations to pump storm water from the area behind the dike into the Connecticut River at high water stages. The Cherry Street Pumping Station has two 16 inch diesel-engine-driven volute pumps. A single phase 230/115 volt power supply furnishes electricity for lighting, a sump-pump, and a battery charger. The Pitkin Street Pumping Station has two 20 inch diesel-engine-driven volute pumps, and the same type of power supply as the Cherry Street Station. The Meadow Hill Pumping Station has four 30 inch diesel-engine-driven propeller pumps for pumping storm water, and a 20 inch variable speed electrically-driven volute pump for pumping sewage. A 100 k.w. gasoline-engine electric generator is provided to furnish electricity for the sewage pump, lighting, and all station auxiliaries in the event of failure of the utilities power supply. A storage pond is provided in conjunction with the pumping station to allow an inflow of storm water greater than the pumping capacity of the station to be stored without damage to the protected area. The interior area is beginning

to experience extensive development. Although an interior drainage analysis was not part of this assessment, such future development should be reviewed by locals and developers for its potential effect on interior runoff and drainage facilities.

2. MODIFICATIONS

There have not been any significant modifications to the existing dike and wall system in East Hartford since the project was completed in 1943. The project has been well-maintained over the years through a vigorous maintenance program instituted by the Town of East Hartford. Recently, part of this program has been to replace the original gas engines in the pumping stations with more efficient and durable diesel engines. The engine replacements were completed in October 1989.

However, in recent years, there has been a desire by developers to replace sections of the dike with concrete floodwalls, and use the area of the former dike footprint for the construction of new residential and office buildings. This has been the result of escalating real estate prices in the area, which puts a high value on the land that the dike currently occupies. The Regulatory Branch of the U.S. Army Corps of Engineers is currently considering one of these proposals. Modifications to the L.P.P. due to future development projects will most likely occur during the next several years, and will involve the replacement of dikes with concrete floodwalls.

3. DAMAGES PREVENTED

The method by which damages prevented (benefits) are computed is to compare the naturally flooded area with the area protected by the LPP.

Based on current hydrology, if there were a recurrence of the 1936 event with the existing dike and upstream system of reservoirs in place, all damages to East Hartford would be prevented. With the upstream reservoirs in place without the dike, a recurrence of the 1936 event would cause an estimated $54 million in damages to the town. Thus, in a recurrence of the 1936 event, the LPP by itself would prevent $54 million in damages to the town.

4. LEVEL OF PROTECTION

The East Hartford Local Protection Project provides protection against floods on the Connecticut River. It was originally designed for a Connecticut River flow at Hartford of 248,000 cfs, which is equivalent to a design flood stage of 35 feet NGVD at the Memorial bridge in East Hartford. At the time the project was built in 1943, the extent of upstream flood control reservoir construction was not determined. For this reason, the project was built with 5 feet of freeboard for earth dikes, and 3 feet of freeboard for concrete walls. Current design practice generally uses 3 feet of freeboard for earth dikes, and 2 feet for concrete walls. As the project exists, with the existing system of upstream reservoirs in place, and using current hydrology, the town of East Hartford is protected up to a 700 year event (0.14% chance of occurrence). This includes freeboard of current design practice (see Plate 2).

5. RECENT INSPECTIONS

The most recent semi-annual inspection by Corps of Engineers personnel was conducted on 4 October 1989. The project was determined to be in excellent condition because of the effective maintenance program in use, with only minor deficiencies, including;

- The meadow Hill Pumping Station requires repairs to cracks in the east and west faces of the building and recaulking of floodwall construction joints.

- The metal work at the Pitkin Street Pumping Station is in need of painting.

B. PROJECT AREA

1. Description

The area protected by the East Hartford LPP consists of approximately 760 acres of developed land in the center of East Hartford Included in these 760 acres is the town center, commercial and industrial areas, residential areas, and public property. The industrial and commercial areas tend to be in the middle and western part of the town, whereas the residential area is concentrated in the north and east. The trend in recent years and for the near future is for increasing development and higher density along the Connecticut River in the vicinity of the dike and wall system. Most of the businesses and residences in the protected area are well maintained, indicating that the owners feel their properties are safe from flooding.

2. Hydrology and Hydraulics

Historic floods on the Connecticut River for which reliable records exist date back to 1838, and some information is available dating as far back as the 1600's. In more recent years, the three greatest floods of record have occurred. These were in March 1936, September 1938, and June 1984. The March 1936 flood produced a stage of 37.0 feet NGVD at the Hartford gage, where as the September 1938 and June 1984 floods produced stages of 34.8 feet NGVD and 30.7 feet NGVD, respectively.

TABLE 1
GREATEST FLOODS OF RECORD
HARTFORD, CONNECTICUT

DATE	Flood level at Memorial Bridge	Discharge at Middletown, CT
*March 1936	37.0 ft. NGVD	267,500 cfs
*September 1938	34.8	239,000
June 1984	30.7	186,000
August 1955	30.0	188,000
May 1854	29.2	180,000
November 1927	28.4	172,000
April 1987	25.6	140,500

* The system of 16 reservoirs did not exist at the time of the two greatest floods of record. If they had been in place, the projected flood levels and discharges would be; 32.4 ft. and 206,100 cfs for the March 1936 event, and 31.3 feet and 194,500 cfs for the September 1938 event.

Discharge - frequency curves for the Connecticut River at Middletown, Connecticut are shown on Plate 3. These curves represent natural and modified peak flow frequencies. The frequency analyses were made using a Log Pearson Type III analysis. Since the great floods of March 1936 and September 1938, the Corps of Engineers has constructed a system of 16 flood control reservoirs in the Connecticut River Basin. Typical modifications provided by these reservoirs at Middleton are illustrated by the natural and modified discharge - frequency curves shown. It is important to realize that for every occurrence of a certain frequency flood the reduction will not be exactly as indicated by the modified frequency curve. The magnitude of reduction will depend on the storm's orientation with respect to the upstream reservoirs.

A standard project flood (SPF), was developed in 1970 as part of the Connecticut River Basin Comprehensive Study. The SPF was designed so as to maximize run-off from the uncontrolled (no flood control reservoirs) portion of the lower central part of the Connecticut River Basin, and assumed high snowmelt conditions. At Middleton, the natural and modified peak flows would be 383,000 and 321,000 cfs, respectively, resulting in a modified SPF flood elevation of 41.1 feet NGVD at the East Hartford Memorial Bridge. This design flood would produce a flood flow more than 15% greater than the March 1936 floodflow, as modified by the existing system of reservoirs.

III. FUTURE CONDITIONS

A. LAND USE/COMMUNITY PLANS

Since the last appraisal of the East Hartford Local Protection Project in 1978, some development has occurred in the riverfront area along East River Drive and James Street. This development includes office buildings, light industry, and a large condominium complex. The condominium complex sold out in only three days, which indicates that the area will be subject to further, similar development in the future. In fact, according to the Town Planning Office, much of the land adjacent to the dike has become high-valued real estate, and an office, condominium, and retail development worth over a billion dollars is currently being planned for the site adjacent to the existing condominium complex. If demand stays strong, expectations are for continued build up of the area in this manner in the near future.

B. PROJECT INTEGRITY

The East Hartford LPP has performed the intended purpose to date. The semi-annual inspections performed by the Corps of Engineers have found very few deficient items, and the project is in excellent condition. The walls, dikes, and pumping stations are sound and should provide the intended purpose well into the future. With the maintenance program currently in use the integrity of the project should not be diminished or threatened.

IV. CURRENT PLANNING AND DESIGN CRITERIA

A. FREEBOARD

1. Requirements

There are no specified criteria with regard to the design level of protection for flood damage reduction projects. Each project should be complete within itself and provide the maximum net benefits, unless there is overwhelming justification to deviate. In urban areas the Standard Project Flood is often a design goal since potential failure or overtopping of structures can cause very costly damages.

Engineering regulations generally call for freeboard allowances above design grade of 2 feet for concrete walls and 3 feet for dikes or levee systems. The project was built with 5 feet of freeboard for dikes and 3 feet for concrete walls in order to compensate for the question of whether the 20 planned reservoirs would actually be built. Over the years, 16 of the 20 were eventually constructed.

2. Economics

A 1978 damage survey report by the Corps of Engineers identified potential flood related losses among land use categories, and the percentages were as follows; residential 20%, commercial 54%, industrial 11%, roads 6%, public use 5%, vehicles 3%, and vacant lots 1%. Current land use in the protected area has not changed significantly since the 1978 survey, except for several new commercial structures and the condominium complex.

EM 1120-2-104 outlines the procedure regarding benefits for advance replacement of existing structures which are approaching the end of their economic life. A credit can be taken for extending the life of a project and realizing benefits beyond which the project would have continued to function. However, this study did not address this issue because an engineering analysis would have had to have been performed to determine the remaining life of the LPP. Also, the LPP is currently in excellent condition and indications are that it has many years left in its physical life.

V. MODIFICATION OPPORTUNITIES

A. LEVEL OF PROTECTION

Opportunities to increase the level of protection of the East Hartford LPP exist, but they are limited. Increasing the level of protection would involve the raising of both dikes and walls or the replacement of dikes with walls of higher elevation. In order to provide SPF protection, the existing walls and dikes in East Hartford would have to be raised 4.3 feet. For walls this would mean adding a concrete cap to the top of the existing wall section. For dikes, basically three options exist. The first would be to raise the dike and extend the dike footprint to the riverside. The second would be to raise the dike and extend the dike footprint to the landside. The third would be to place a concrete wall on top of the dike to gain additional height. Replacing dikes with new walls would be utilized by developers if and when they make use of the land currently occupied by the dike footprint. All these methods have distinct advantages and disadvantages and all would be very costly. These efforts would be an attempt to provide SPF protection to the town of East Hartford. However, since the LPP already provides such a high degree of protection, up to about a 700-year event, raising the dikes and walls to an even higher level would yield only minimal economic benefits. The incremental damage reduction attributable to raising the dikes and walls would be insignificant when compared to the costs of such a project.

B. PROTECTED AREA

Inspection of areas downstream and upstream of the LPP reveals that a flooding problem does not exist in these areas, and extension of the dikes is not needed at the present time.

C. PROJECT FEATURES

Items noted as deficient in the recent inspection report should be attended to for assurance of project integrity and purpose.

VI. FINDINGS AND CONCLUSIONS

The East Hartford LPP is in excellent condition and is expected to continue to perform it's intended function. It provides a very high level of flood protection, up to a 700 year event, and raising the structures to even higher levels of protection would yield minimal economic benefits. At this time, modifications to the East Hartford LPP are found to be unnecessary.

VII. RECOMMENDATIONS

Modifications to increase the level of protection provided by the East Hartford LPP are not recommended at this time. Due to the anticipated development in the dike area over the next few years, and because the structures will be over 50 years old in 10 years, 1999 would be an appropriate time for the next review. In addition, if developers begin to replace existing dike structures with concrete floodwalls in order to gain additional lands, it is recommended that these developers be required to replace any section of dike that they remove with a new concrete wall built to the same height and providing the same level of protection. Any contemplated changes to the dike and wall system must be submitted to and approved by the Corps of Engineers prior to implementation as stated in the Operation and Maintenance Manual, Section 3-02.5.

If these new walls are placed closer to the banks of the Connecticut River than the present dike structure, then the cross sectional flood flow area of the Connecticut River will be reduced. In such a case, a detailed hydrologic analysis should be required of the developer to determine the effect of the reduced flood flow area on flood elevations. Further revised flood profiles should be determined for the 100 year, the original project design flood, and the standard project flood discharges to determine the effect a revised floodwall alignment has on flood profiles throughout the affected portion of the Connecticut River. This hydrologic analysis should be reviewed and concurred with by the State of Connecticut and the Army Corps of Engineers. Input should also be provided as to how the new developments will affect interior drainage characteristics of the protected area, and how existing drainage facilities, including the pumping stations, will be effected. The Corps of Engineers recognizes the stream encroachment lines established by the State of Connecticut for the Connecticut River.

VIII. CORRESPONDENCE

July 13, 1988

Plan Formulation Branch
Planning Division

Honorable Robert F. NcNulty
Mayor, City of East Hartford
East Hartford, Connecticut 06108

Dear Mayor McNulty:

I have initiated a review of the existing East Hartford Local Flood Protection Project completed by the Corps of Engineers in 1946. This project, like others we are studying in New England, was designed and constructed many years ago using design criteria in effect at the time. Our study will include a review of the adequacy of flood protection currently provided by the project and recently proposed or future private development in and around the project. We will also be looking for opportunities to make the project more viable, safe and reliable using current design standards.

Initially the study will be limited to a reconnaissance report which will evaluate the need for any modification to the completed project and determine whether there is a Federal interest in continuing the investigation. If warranted, I may recommend a follow-up feasibility study. During the feasibility study stage, proposed modifications would be reviewed and any other modification plans formulated would be reviewed using current design criteria and screened from the standpoints of economics, environmental effects, engineering integrity and safety considerations. Items of local cooperation, including existing, proposed and those required for the future, will also be addressed if further action is recommended.

This study is not a substitute for the annual inspections performed by my Operations Division personnel. Those inspections are conducted to ensure that the city is complying with the assurance of local cooperation signed by the city prior to construction of the East Hartford project. This reconnaissance study will utilize previous inspection reports and correspondence with the city as background information and will identify existing and potential problems previously observed which should be reviewed as part of this study.

Your comments are vital to our study. In the near future, a member of my staff will be contacting you or a person you appoint to set up a meeting to discuss our study and hear your viewpoints. If you have any questions or comments, please do not hesitate to call me at (617) 647-8220. Mr. Paul J. Albrecht will be managing the study. He may be reached at (617) 647-8381.

Sincerely,

Thomas A. Rhen
Colonel, Corps of Engineers
Division Engineer

cc:
Mr. Martin 114N
Mr. Manor 106
Reading Files
Plng. Div. Files 114S

FEB 3 1989

Planning Division
Basin Management Branch

Ms. Leslie Carothers, Commissioner
Department of Environmental Protection
165 Capitol Avenue
State Office Building
Hartford, Connecticut 06115

Dear Commissioner Carothers:

On November 28, 1988 representatives of the Corps of Engineers and members of the Connecticut Department of Evironmental Protection met to discuss the scope of work for a Flood Plain Management Services (FPMS) investigation of the flooding problems along the Connecticut River. Mr. Alan Williams of your staff expressed concerns regarding proposed alterations by a private developer to the Corps-constructed East Hartford Dike. His concerns centered on the State's desire to insure the future structural integrity of the project, its continued operation and maintenance, and the role of the Corps of Engineers would have regarding any proposed modification to a Corps-constructed, locally operated and maintained project. It was agreed at the meeting that my staff would look into this matter and provide the State with pertinent information.

The New England Division is aware of a proposed modification to the East Hartford Dike in which a developer would like to remove a portion of the earthen dike and replace it with a concrete wall. This project, as well as any future proposed alteration to a Corps of Engineers project, must be reviewed and approval granted by the New England Division. This office will not approve any plan for construction without the prior approval of the local sponsor and the State of Connecticut. The proposed alteration must retain the structural integrity of the project as defined by published Corps of Engineers Regulations. The responsibility for the maintenance and operation of the project and any modification will remain with the local sponsor. The Corps of Engineers inspects all local protection projects at least on an annual basis to insure the project's integrity and that it is functioning properly.

The New England Division recently began an investigation to review the adequacy of the protection afforded by the East Hartford Local Protection Project. Mr. Paul Albrecht of our Plan Formulation Branch is the project manager of this investigation. If you have any questions concerning the East Hartford Dike investigation please contact Mr. Albrecht at (617) 647-8381.

If you have any questions regarding this information please contact Ms. Barbara Notini at (617) 647-8544.

Sincerely,

Stanley J. Murphy
Lt. Colonel, Corps of Engineers
Acting Division Engineer

Copies Furnished:

Mr. Alan Williams
Natural Resources
Department of Environmental Protection
RM 555
165 Capitol Avenue
Hartford, Connecticut 06106

Mr. Charles E. Berger Jr.
Water Resources Unit
Department of Environmental Protection
RM 215
165 Capitol Avenue
Hartford, Connecticut 06106

cf:
Ms. Notini, 112N
Mr. Kennelly, 112N (w1111)
LRPS, 112N
Mr. Manor, 106S
Mr. Albrecht, 114N
Reading File
BMB File, 112N
Ping Div File, 114S

October 13, 1989

Operations Division,
Project Operations Branch

Honorable Robert McNulty
Mayor of East Hartford
East Hartford, Connecticut 06108

Dear Mayor McNulty:

My representatives conducted the semi-annual inspection of the federally constructed local protection project in East Hartford on October 4, 1989. I have enclosed a detailed inspection report for your review.

The project is in excellent condition. We are pleased that new engines are being installed at the Pitkin and Cherry Street pump stations and that the trees have been removed from the embankment adjacent to the Phoenix project.

We appreciate the cooperation and assistance we received during the inspection. If any technical assistance is needed in the operation and maintenance of your project, please call me at (617) 647-8411 or Mr. Robert Hanacek, Thames River Basin Manager at (508) 987-0108.

Sincerely,

LAW

ROSATO

MANOR

B. C. Manor
Chief, Project Operations Branch

Enclosure

Copies Furnished:

Mr. William J. Kennedy
Director of Public Works
Town Hall
740 Main Street
E. Hartford, CT 06108

Mr. Louis Marchetti
Supt. of Operations
Town Hall
740 Main Street
E. Hartford, CT 06108

Mr. Rocco Toce
Supt. of Flood Control Dikes
Dept. of Public Works
Town Hall
740 Main Street
E. Hartford, CT 06108

Mr. Alphonse J. Letendre
Conn. Dept. of Env. Protection
State Office Building
165 Capital Avenue
Hartford, CT 06106

Conn. River Valley Flood Contr. Com.
466 Main St.
Greenfield, MA 01301

BM, TRB
PM, Mansfield Hollow
Opers. Div. Files

LOCAL FLOOD PROTECTION PROJECT INSPECTION REPORT

Project: East Hartford

Maintaining Agency:

Type Inspection: X Semi-Annual Staff ___ 90 Day Interim

River Basin: Thames Date of Inspection October 4, 1989

Feature	Sat	Unsat	Deficiencies
PUMPING STATIONS - STRUCTURES			
INTERIOR	X		
EXTERIOR	X		See Comments
PUMPS - MOTORS - ENGINES			
TRIAL OPERATED	X		See Comments
GENERAL CONDITION	X		
POWER SOURCE	X		
INSULATION TESTS	X		
METAL INTAKES/OUTLETS	X		
GATE VALVES	X		
GATES - DRAINAGE STRUCTURES			
TRIAL OPERATED	X		
GENERAL CONDITION	X		See Comments
LUBRICATION	X		
DIKES - DAMS			
GENERAL CONDITION	X		See Comments
SLOPES/EROSION	X		
SAND BOILS/CAVING	X		
TRESPASSING	X		
SLOPE PROTECTION	X		
DRAINS	X		
STOP-LOGS - LOG BOOM			
CONDITION OF LOGS	X		
AVAILABILITY OF LOGS	X		
HIGHWAY SLOTS	X		
STORAGE FACILITIES	X		
CHANNELS - OUTLET WORKS CHANNEL			
BANKS	X		
OBSTRUCTION CONTROL	X		

NED FORM JAN. 66 513

Feature	Sat	Unsat	Deficiencies
CONCRETE STRUCTURES			
SURFACE	X		
SETTLEMENT	X		
JOINTS	X		
DRAINS	X		
MISCELLANEOUS			
EMERGENCY OPER. PLAN	X		
EMERGENCY EQUIPMENT	X		
SEMI-ANNUAL REPORT	X		

Inspection Party:

Rocco Toce, Supt. of Flood Control Dikes, E. Hartford
Wayne Hawthorne, Corps of Engineers
Bob Pisano , Corps of Engineers
Jim Law, Corps of Engineers

Photographs Taken:

None

Remarks & Additional Comments:

(Indicate Here Observations, Discussions, Specific Feature Deficiencies, Recommendations and any other pertinent information. Use Continuation Sheet if necessary.)

See attached sheets.

X ALL APPLICABLE ITEMS. IF UNSAT INDICATE SPECIFIC DEFICIENCIES. INDICATE IF NOT APPLICABLE.

DATE	INSPECTED BY: TYPED NAME & TITLE	SIGNATURE
10/12/89	Jim Law, Civil Engineer	

East Hartford, CT - LPP

Comment #1

Meadow Hill Pumping Station

a. The engines ran satisfactorily

Time on engines:	Fall '88	Spring '89	Fall '89
	778	816.0	853
	378	407.1	430
	854	930.3	1001
	741	760.8	775

b. The emergency generator operated satisfactorily; time on the engine is 149.2 hours.

c. Sump pump is ok.

d. Floodwall construction joints should be recaulked where appropriate as previously noted.

e. Minor cracks along the east and west faces of the building still need repair.

f. The area where new fuel tanks were installed should be regraded, loamed, and seeded. Presently, the water drains directly toward the foundation.

g. All brush and trees adjacent to the outfall abutment walls should be removed.

Comment #2

Pitkin Street Pumping Station

a. Engines in process of being replaced with new engines.

b. The trash racks and metal work still need painting.

Comment #3

Cherry Street Pumping Station

a. New engines recently installed. Time on Engines: Engine #1 - 1.1 hours, Engine #2 - .7 hours.

b. Some exterior building maintenance is needed as noted in previous reports.

c. Mr. Toce noted that it is difficult to get replacement parts for the existing service. Recommend that new 100 AMP service be installed.

General Comments

The herbicidal treatment and brush cutting program continues on a regular basis. The area adjacent to Pitkin Street has been recently cut.

Close Bulkhead Door – Shell Oil Co.

Start Cherry Street Pumping Station

Start Meadow Hill Pumping Station

Start Pitkin Street Pumping Station

Close Railroad Stop Log Structure

Close Main Street Stop Log Structure

11.55 UNITED STATES WEATHER BUREAU

11.00 MEAN SEA LEVEL

GAGE

HOCKANUM RIVER

MAIN ST. STOP-LOG STRUCTURE

OUTLET CHANNEL

HARTFORD EAST SECTION SOUTH

DIKE

STORAGE POND

MEADOW HILL PUMPING STATION

ACCESS ROAD

PITKIN ST

SAUNDERS ST

CONNECTICUT BLVD.

GOVERNOR ST

Existing drainage ditch

THE SWALE

HARTLAND ST

MEADOW ST

PITKIN ST

FLORENCE ST

GILBERT ST

ASH ST

OAKLIN ST

PITKIN ST PUMPING STATION

Existing bulkhead

Outfall

PLEASANT ST

SULLIVAN ST

CHERRY ST. PUMPING STATION

GOVERNOR ST

WILSON ST

VILLAGE ST

CHERRY ST

NELSON ST

JENCKS ST

R.R. STOP-LOG STRUCTURE

MEMORIAL BRIDGE

Existing dike

To Springfield

GREEN TERRACE

ADAMS ST

TOWN OF EAST HARTFORD

Existing drainage ditch

HARTFORD DIKE NORTH SECTION

Timber pile groins

Area of proposed dredging

Dumped rock in river bed

CONNECTICUT RIVER

CITY OF HARTFORD

Existing dike

LEGEND

- Improved roads and streets
- Unimproved roads and streets
- Railroads
- Dike
- Dike - riverside riprapped

CONNECTICUT RIVER FLOOD CONTROL

EAST HARTFORD DIKE.

GENERAL PLAN

CONNECTICUT RIVER — CONNECTICUT

SCALE: 1 IN. = 400 FT.

U.S. ENGINEER OFFICE, PROVIDENCE, R.I.

OPERATION AND MAINTENANCE MANUAL

EAST HARTFORD, CONN.

PLATE 1

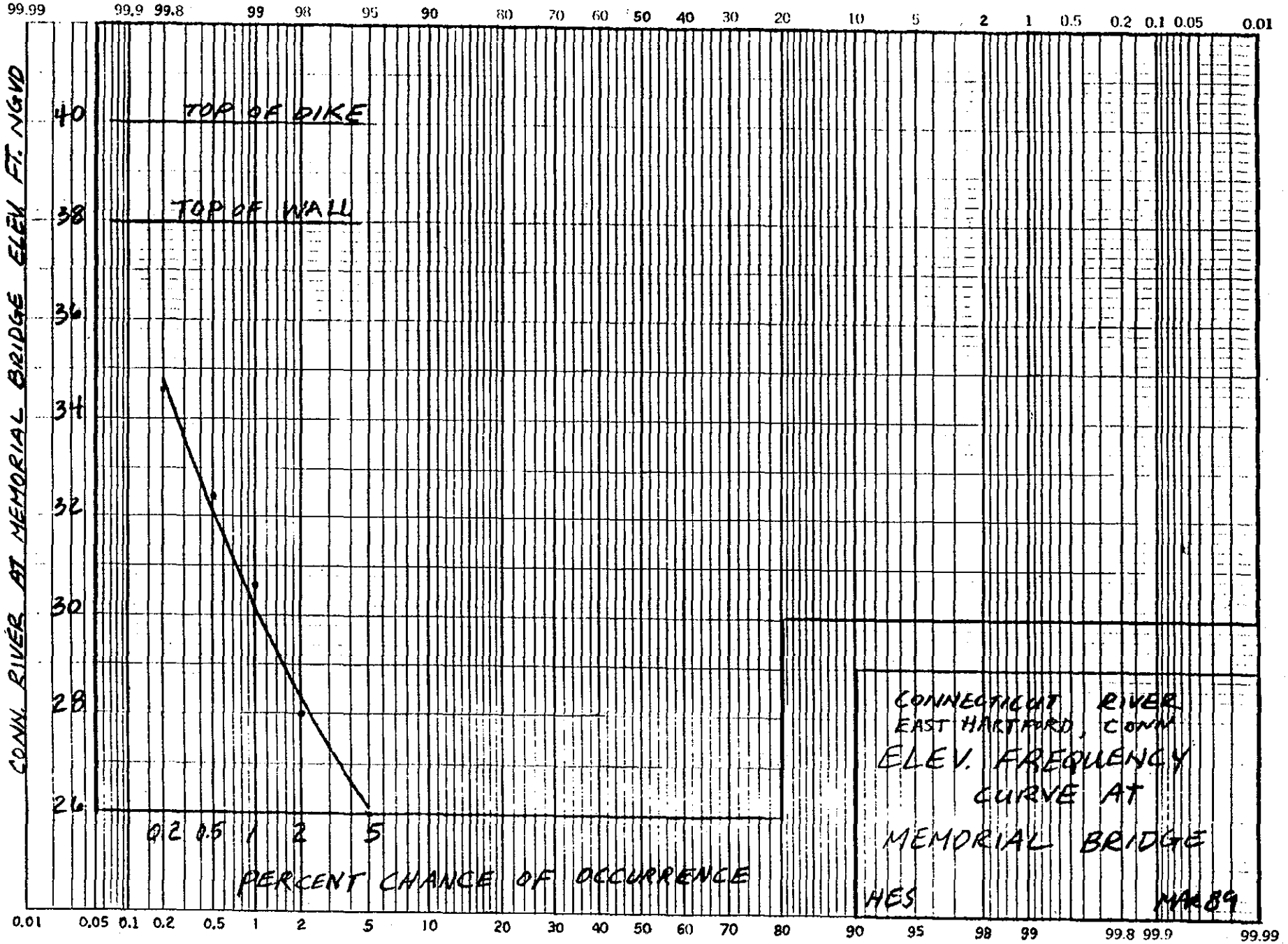
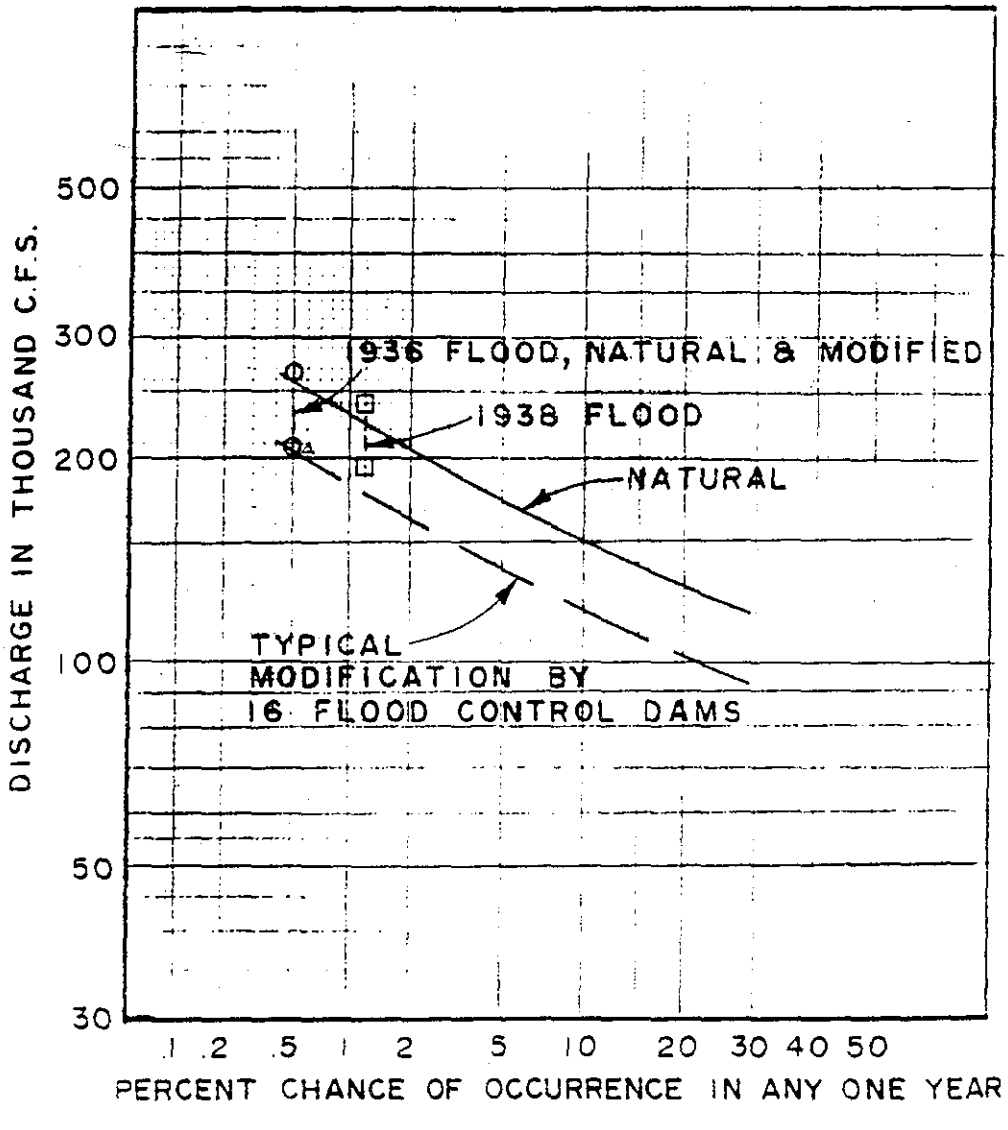

99.99
99.9 99.8
99
98
95
90
80
70
60
50
40
30
20
10
5
2
1
0.5
0.2
0.1
0.05
0.01
CONN. RIVER AT MEMORIAL BRIDGE ELEV FT. NGVD
40
38
36
34
32
30
28
26
TOP OF DIKE
TOP OF WALL
0.2
0.5
1
2
5
PERCENT CHANCE OF OCCURRENCE
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
CONNECTICUT RIVER
EAST HARTFORD, CONN
ELEV. FREQUENCY
CURVE AT
MEMORIAL BRIDGE
HES
MAR 89

PLATE 2



CONNECTICUT RIVER
DISCHARGE FREQUENCY
CURVE AT
MIDDLETOWN, CONNECTICUT

PLATE 3

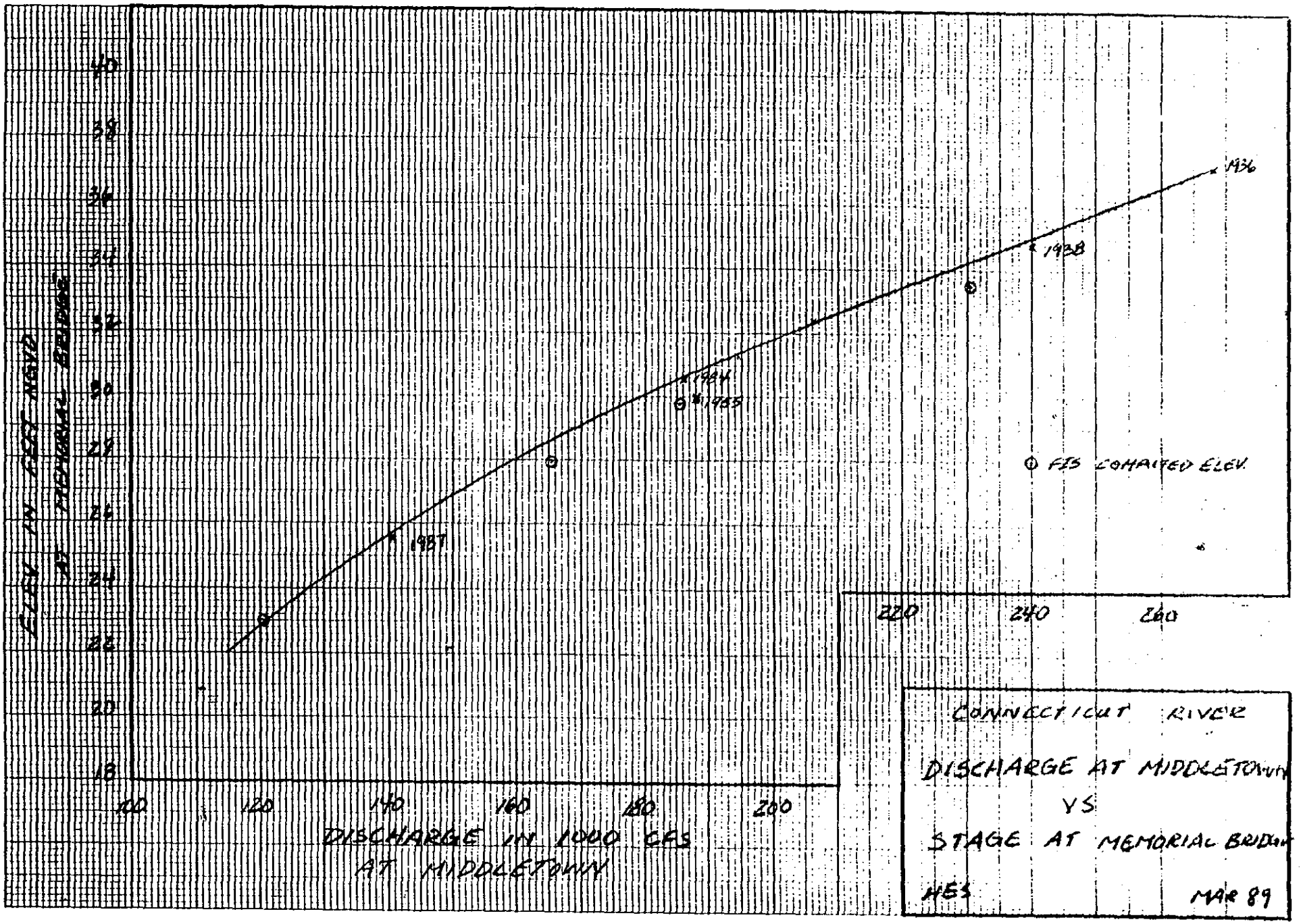

40
38
36
34
32
30
28
26
24
22
20
18
STAGE IN FEET ABOVE MSL DATUM
100
120
140
160
180
200
220
240
260
DISCHARGE IN 1000 CFS AT MIDDLETOWN
1936
1938
1944
1955
1957
FIS COMPUTED ELEV.
CONNECTICUT RIVER
DISCHARGE AT MIDDLETOWN
VS
STAGE AT MEMORIAL BRIDGE
HES
MAR 89

PLATE 4